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Aseel Farhat, Evelyn M. Lunasin* (lunasin@usna.edu) and **Edriss S. Titi.** *On the Charney Conjecture of Data Assimilation Employing Temperature Measurements Alone: The Paradigm of 3D Planetary Geostrophic Model.*

Analyzing the validity and success of a data assimilation algorithm when some state variable observations are not available is an important problem in meteorology and engineering. We present an improved data assimilation algorithm for recovering the exact full reference solution (i.e. the velocity and temperature) of the 3D Planetary Geostrophic model, at an exponential rate in time, by employing coarse spatial mesh observations of the temperature alone. This provides, in the case of this paradigm, a rigorous justification to an earlier conjecture of Charney which states that temperature history of the atmosphere, for certain simple atmospheric models, determines all other state variables. (Received September 20, 2018)